

Aircraft as Cultural Resources

The Navy Approach

The Navy Department's Naval Historical Center, through a joint Department of Defense Legacy Resource Management program with the National Park Service's National Maritime Initiative and the National Conference of State Historic Preservation Officers, is developing a preservation management plan for the protection of the Navy's historic naval aircraft and aircraft wreck sites. This plan, among other things, seeks to comply with the National Historic Preservation Act (NHPA) by creating a framework that allows systematic identification, evaluation, and nomination of significant historic and archeological aircraft to the National Register.

For the purposes of this discussion, "archeological aircraft" are those aircraft that exist as crash sites or crash site debris fields. Initial work in the developing Navy management plan focuses on underwater sites since these are the best preserved and consequently most threatened by salvors. The staff at the Naval Historical Center (NHC) has encountered issues surrounding aircraft preservation previously identified in CRM as well as some new concerns. The first issue confronting the

Navy is the scope of the work.

Excluding trainers and utility aircraft, the U.S. Navy acquired 73,414 aircraft between 1916 and 1969.¹ Between July 1940 and June 1945 the Navy

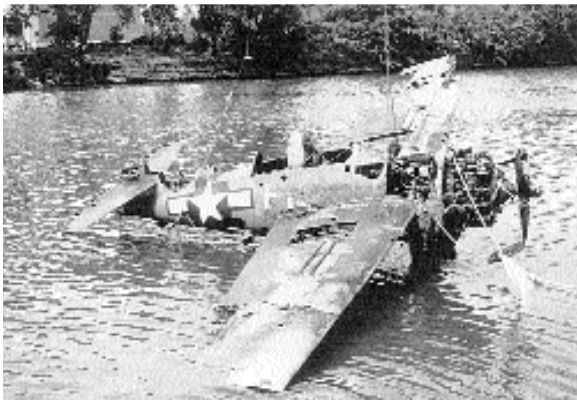
purchased 75,032 aircraft. Thus, for the World War II era alone there are 75,032 potential structures over 50 years old to be evaluated for historic significance. If we use participation in combat as a flag for potential significance we find nearly 3,000 combat losses in the Pacific alone. What is the

most practical manner of handling this number of resources in the identification phase of NHPA compliance? The second issue confronting the Navy is universal to all potentially historic aircraft—application of the standards of integrity to aircraft. Finally, and perhaps most importantly, the NHC has found an almost universal failure to recognize the potential importance of aircraft crash sites as archeological sites.

The solution proposed to the first concern is not the simple, concise fix for which we had hoped. Using Mr. Paul Diebold's recommendation for wrestling with numbers in the identification phase, we sought to identify a concise source on aircraft status and inventory.² It was hoped that a document could be found in the National Archives, NHC Operational Archives, or NHC Aviation History branch that identified by bureau number the location and status of aircraft in a given period. For instance, a report that lists the bureau number of aircraft assigned to the various squadrons on board aircraft carriers in TF-58 in June of 1944 would provide a working list of aircraft that participated in the June 19 "Marianas Turkey Shoot" and the attack on the Imperial Japanese Navy the following day. Comparison of such a list with crash site data would quickly identify potential candidates for the National Register. Unfortunately, a report with such a format has yet to be located and will probably have to be compiled from other documents.

The solution developed and currently being tested centers on the idea that the Historical Center is seeking to identify crash sites. The primary sources to identify these sites are the Aircraft Accident Report cards and Aircraft History cards on file with NHC's Aviation History Branch. The Accident cards are synopses of accident investigations. These cards list Navy aircraft accidents, including crashes, by type of aircraft and bureau number. Each Navy aircraft is assigned a bureau number for identification, thus individual aircraft can be identified. The problem with this file is its size. The accident report files at NHC Aviation History currently contain over 150 reels of microfilm.

This F4F-3A, recovered from Lake Michigan in 1993, is an example of the challenges facing aircraft preservation specialists.



The Aircraft History cards are also filed by bureau number. These cards document the aircraft's assignment history from acceptance by the Navy to the time they are struck from the active list. Thus, a crash site aircraft can be evaluated for its historic potential by reviewing which units it was assigned to and when it was assigned.

Two approaches were considered for the crash site survey. The first was a regionally organized inventory of sites, the second, a survey prioritized by aircraft type. A regional survey would allow identification of a threatened area and produce a relatively quick database of sources in that region. The problem with this approach is that it means duplication of effort. Each time a region that flew SBD Dauntless dive bombers is surveyed, the SBD section of the accident cards will be surveyed again. The alternate method considered was a systematic survey of the accident cards by aircraft type. For example, all of the lost SBDs would be culled, then all of the F6F Hellcats, and

so on. While this approach eliminates duplication of effort, it delays the production of a usable database.

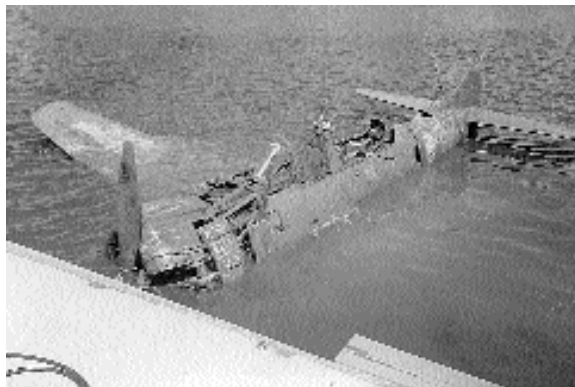
Our solution to the problem is to prioritize regions to be surveyed, identify the his-

toric Navy flying units within that region along with the types of aircraft they flew, compile a priority list of aircraft types to be surveyed, and then survey the accident cards by those types. The accident card survey will produce a database of potential crash sites by type of aircraft. The bureau numbers identified by this survey will then be researched in the aircraft history cards to identify their previous assignments and potential involvement in a historic event. The assignment information on the history cards will be added to the accident report information in the database. For example, Navy aircraft in Lake Michigan have been identified as sites under pressure from salvage operations. A unit survey found a Naval Air Station Glenview, near Chicago, and the training aircraft carriers associated with Glenview, Wolverine and Sable. These units operated fighters such as the Wildcat and Corsair as well as the Dauntless dive bomber. With this list, priorities were set to survey SBD Dauntless, FM-1, FM-2, and F4F Wildcats, and the various Corsair types that crashed world wide. This approach allows a

compromise between focus on aircraft in specific threatened areas and a single pass through the records by aircraft type. However, it will take more time to complete information on a specific area.

The second issue confronting our preservation planning is universal to all aircraft—the application of the National Register standards of integrity. The Naval Historical Center Aircraft Cultural Resource Management plan has examined each category of integrity and interpreted it in terms of potentially historic aircraft. The fundamental questions revolve around aircraft as mass produced mobile machines. National Register integrity standards do make provisions for properties designed to be moved, thus an aircraft that participated in the battle of Midway need not be on or near Midway Island to qualify as significant under Criterion A.³ Integrity of design is a function of research into the design of a given aircraft type; therefore, it is handled no differently than other property types. A researcher with a background in aviation history can quickly verify integrity of design. An aircraft is either an F4F-3 or it is not. It either has design features associated with F4F-3 aircraft (wings that do not fold and four machine guns, to site two examples) or it does not. Integrity of feeling and association are also comparable to requirements for other property types. The most difficulty comes with determining integrity of materials, setting, and workmanship.

Aircraft are relatively fragile machines intended to operate in an environment unforgiving of failures in judgment or materials. As a result, aircraft incorporate redundant critical systems and a systematic process of inspection and replacement of components. It is the nature of an aircraft to have components replaced on the basis of time in operation and condition. Thus, an SBD that participated in the battle of Midway and which was subsequently lost in a training accident two years later almost assuredly does not have the same engine it had when it participated in the historic event. Is this a breach of integrity of materials? It should not be considered a lack of integrity since the aircraft was designed to have the engine replaced on a systematic basis. Integrity of materials should be evaluated in the context of materials that are appropriate to the type of aircraft and which are contemporary to the aircraft's service life. A 1943 SBD-2 Dauntless dive bomber should have a Pratt and Whitney R-1820-32 radial engine. If it has an R-1820-32 engine that was installed by restoration activity rather than its last operational unit, the aircraft would have less integrity of material. If it had an engine that was not an R-1820-32 it would lack integrity of materials at least as far as the engine is concerned. Yet, neither of the last two instances cited above



This SBD-1, recovered from Lake Michigan in 1994, is being restored by the Battleship Alabama Memorial. Courtesy Battleship Memorial Park/Mobile, AL.

should, by itself, disqualify an aircraft for nomination. As Diebold indicated, final integrity of materials evaluation should be based on how much of the aircraft's structural material (spars, stringers, frames, and skin material) is contemporary to the aircraft's operational life.

Integrity of workmanship is also a concern for evaluation of aircraft as National Register properties. What evidence of workmanship can be found in a mass produced item? Integrity of workmanship, like that of materials, should be assessed in terms of the aircraft's operational life. The workmanship on aircraft that are still flying is vulnerable to operational needs, thus the importance of aircraft crash sites and static aircraft. The maintenance requirements for aircraft mean that indications of workmanship may supplant each other. For instance, in April 1944, an F6F squadron realized that pilots were inadvertently hitting the "Flap Up" switch as they advanced the throttle during their take-off roll. Since a flap up condition during take off could and did result in an unintended landing, usually in the water, the squadron installed a locally-manufactured switch guard and attached it, using the existing flap switch mount bolts.⁴ As time went on the Navy's Bureau of Aeronautics may have issued a fleetwide repair for this hazard that called for complete relocation of the flap switch box. Thus, an F6F-3 from VF-2 that crashed on April 28, 1944, would have a flap switch guard as evidence of workmanship while an F6F-3 crash site from March (prior to the modification) or June (after a theoretical Bureau of Air modification) might lack this modification. Evidence of workmanship on aircraft should be viewed in the same light as information in a terrestrial habitation site that has been occupied for generations—there will be a "stratigraphy" of workmanship provenance. Two examples of workmanship found on aircraft recovered from underwater sites to date are the engine case bolts on an SBD-2 recovered from Lake Michigan and a chow hall butter knife found on an F6F-5. On the SBD-2, the safety wire connecting the engine bolts, intended to keep the bolts from backing out, is installed backwards on the entire engine. The government-issue butter knife found in the cockpit of an F6F-5 recovered from the waters off Nantucket Island, Massachusetts, was found mounted in the cockpit. This knife, found mounted in a bracket, has been sharpened to a point and honed to a sharp edge. In the F6F-5, the life raft sat in the cockpit seat pan acting as a seat cushion for the pilot. The modified butter knife was probably used to deflate the raft in case of accidental inflation. The F6F-5 also has pencil marks on an interior bulkhead that probably are factory production floor directions. The Air and Space Museum's Garber Facility has found

Japanese lettering on an internal bulkhead of an Ohka flying bomb that indicated it had been built by a class from a girls' high school.

The above indications of workmanship are evidence of the importance of studying aircraft crash sites for their information potential. Presently, the lack of research on aircraft's role in American culture means that old aircraft and aircraft crash sites are often regarded as junk except by the relatively few restoration enthusiasts and those who supply them. An undisturbed crash site offers evidence of operational and maintenance usage as well as information about the cause of the crash itself. The site location itself may hold clues to unsuspected activity. For instance, a practice carrier landing deck was found in Rhode Island by recognizing a pattern of local crashes.⁵ It is proposed in our management plan that aircraft crash sites, potentially eligible for the National Register, be surveyed for archeological data that indicate cause of crash, operational modifications, or other significant data that might in themselves make the site eligible for nomination under Criterion D.

The Navy's approach to management of its historic and archeological aircraft seeks to comply with National Historic Preservation Act tasking in a responsible manner. The number of potential sites to be evaluated and the context of their evaluation are problematic. However, as the preservation community and others are made aware of the value of aircraft as sources of information on our industrial and aviation heritage, and become informed about the operational life of these machines, the process of identification, evaluation, and nomination to the National Register will become less ambiguous and, thus, less subject to controversy.

Notes

- ¹ United States Naval Aviation 1910-1970 Appendix V.
- ² Paul C. Diebold, "Aircraft As Cultural Resources, The Indiana Approach." CRM Vol. 16, No. 10, 1993.
- ³ *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation*. p. 31.
- ⁴ Action Report VF-2 17 April 1944 NHC Operational Archives, Box 434.
- ⁵ Conversation with Peter Capelotti, 21 October 1994.

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Also see *Point of View*, this issue, for additional discussion.